

ASSIGNMENT 3

Textbook Assignment: "Radar Fundamentals," chapter 5, pages 5-1 through 5-16. "Radar Display Equipment," chapter 6, pages 6-1 through 6-8. "Scope Interpretation," chapter 7, pages 7-1 through 7-9.

- 3-1. What component in the radar system produces the signals that trigger other components in the system?
1. Transmitter
 2. Antenna
 3. Modulator
 4. Power supply
- 3-2. In what radar component does the radio-frequency pulse originate?
1. Transmitter
 2. Modulator
 3. Antenna
 4. Indicator
- 3-3. What type of beam does the radar radiate?
1. Omnidirectional
 2. Concentrated
 3. Highly directional
 4. Constant
- 3-4. What radar component allows the use of one antenna?
1. Antenna
 2. Receiver
 3. Duplexer
 4. Modulator
- 3-5. How do the speeds of radio waves and the speed of light compare?
1. They are equal
 2. The speed of a radio wave is slightly faster
 3. The speed of a radio wave is much slower
 4. The speed of a radio wave is much faster
- 3-6. Which of the following characteristics of a radio wave indicates the wave's energy?
1. Amplitude
 2. Frequency
 3. Wavelength
 4. Cycle
- 3-7. What radio wave characteristic is measured in *hertz*?
1. Amplitude
 2. Frequency
 3. Wavelength
 4. Cycle
- 3-8. The space occupied by one cycle is known as "wavelength".
1. True
 2. False
- 3-9. What wave characteristic expresses the number of complete cycles that occur during 1 second?
1. Wavelength
 2. Velocity
 3. Frequency
 4. Amplitude
- 3-10. Which of the following frequencies has the shortest period?
1. 1,000,000 Hz
 2. 100,000 Hz
 3. 10,000 Hz
 4. 1,000 Hz
- 3-11. What is the approximate wave length of a 30-Mhz radar wave?
1. 1 meter
 2. 10 meters
 3. 100 meters
 4. 1,000 meters
- 3-12. In what form does a radar transmit RF energy?
1. Alternating long and short pulses
 2. Short pulses separated by short intervals
 3. Short pulses separated by long intervals
 4. Long pulses separated by short intervals

- 3-13. What is the pulse repetition rate (PRR) of a radar transmitter?
1. The frequency of the transmitted wave
 2. The rate at which the transmitter sends out pulses
 3. The length of time that the transmitter takes to send out a pulse
 4. The length of time between transmitted pulses
- 3-14. The actual time that a radar transmits is known by what term?
1. Pulse width
 2. Pulse repetition rate
 3. Pulse repetition time
 4. Pulse repetition frequency
- 3-15. What term indicates the frequency at which the transmitter operates?
1. Video frequency
 2. Intermediate frequency
 3. Carrier frequency
 4. Pulse repetition frequency
- 3-16. The “peak power” of a radar system refers to what type of power?
1. Power required for sustained transmitter operation
 2. Useful power of the transmitter
 3. Average power per cycle
 4. Average power over a long period
- 3-17. If the pulse width and peak power of a radar transmitter remain constant while the pulse repetition time is increased, how will the average power be affected?
1. It will increase
 2. It will decrease
 3. It will remain the same
 4. It will fluctuate
- 3-18. The duty cycle of a radar system is represented by which of the following ratios?
1. Average power - to - pulse width
 2. Average power - to - peak power
 3. Peak power - to - pulse width
 4. Pulse repetition time - to - pulse width
- 3-19. Which of the following events occurs as the trace starts on the radar indicator scope?
1. The transmitter pulses
 2. The transmitter stops pulsing
 3. The target echo is received
 4. The target echo is displayed
- 3-20. Where should you position the range strobe when you measure range to a target on the PPI scope?
1. On the center of the pip
 2. On the leading edge of the pip
 3. On the trailing edge of the pip
 4. On the pip’s leading edge first; then on its trailing edge, for an average of the two readings
- 3-21. What radar constant has the most effect on maximum range?
1. PRT
 2. PW
 3. PD
 4. PRR
- 3-22. How many microseconds does it take a pulse of RF energy to travel from a transmitter to a receiver 11 nautical miles away?
1. 6.1
 2. 18.6
 3. 37.2
 4. 67.1
- 3-23. What is the maximum theoretical range of a radar set operating at a PRR of 410?
1. 20 miles
 2. 33 miles
 3. 200 miles
 4. 336 miles
- 3-24. A radar using a long pulse width generally has a greater range capability than a set using a short pulse because the long pulse width has which of the following characteristics?
1. It overcomes noise and makes the scope presentation clearer
 2. It requires higher power, and the set is more effective at higher power
 3. It allows a greater amount of pulse energy to be transmitted
 4. It permits a wider beam so a target will reflect more pulses

- 3-25. Which of the following radar operations requires the fastest antenna rotation speed?
1. Long range search
 2. Medium range search
 3. Short range search
 4. Height finding search
- 3-26. Lower frequencies are superior for long-range radars.
1. True
 2. False
- 3-27. A wide radar beam has a greater range capability than a narrow radar beam.
1. True
 2. False
- 3-28. Targets constructed of wood give the best radar reflections.
1. True
 2. False
- 3-29. A more sensitive receiver will detect a weak echo sooner than a less sensitive receiver.
1. True
 2. False
- 3-30. Which of the following factors has the most influence on the minimum range of a radar set?
1. Sea return
 2. Side lobe echoes
 3. Pulse width
 4. Vertical beam width
- 3-31. Two ships are on the same bearing at approximately the same range from your ship. If the radar has a 3-microsecond PW, what is the minimum distance the ships must be separated for you to see two pips on your scope?
1. 246 yd
 2. 328 yd
 3. 492 yd
 4. 984 yd
- 3-32. What are the three essential components of a typical radar antenna system?
1. Antenna, transmission lines, and repeater
 2. Antenna, repeater, and duplexer
 3. Antenna, transmitter, and receiver
 4. Antenna, duplexer, and transmission lines
- 3-33. What type of RF energy beam is produced by a radar antenna?
1. A single, narrow one-directional beam
 2. A spiral non-directional beam
 3. A non-directional cone
 4. A multi-directional beam
- 3-34. What is the term for the bending of radar waves as they pass through an atmosphere of changing density?
1. Refraction
 2. Diffusion
 3. Diffraction
 4. Attenuation
- 3-35. If the visual horizon is 16 miles away, what is the approximate distance to the radar horizon?
1. 12 miles
 2. 16 miles
 3. 20 miles
 4. 24 miles
- 3-36. As radar waves pass a land mass, they sometimes bend slightly around it. This bending of the waves is caused by which of the following phenomena?
1. Refraction
 2. Diffusion
 3. Diffraction
 4. Attenuation
- 3-37. What is radar wave attenuation?
1. The bending of radar waves as they pass through a change of atmospheric density
 2. The bending of radar waves as they pass solid objects
 3. The absorption of pulse energy as the waves pass through the atmosphere
 4. The interference from reflected waves that are out of phase with the transmitted waves
- 3-38. Under which of the following atmospheric conditions will ducting occur?
1. Temperature inversion
 2. Temperature reversion
 3. Temperature conversion
 4. Temperature subversion
- 3-39. When does sea return become evident?
1. During the night
 2. As the weather worsens
 3. When the ship is traveling up wind
 4. During daylight

3-40. In which direction will sea return be more pronounced on the PPI?

1. Down-wind direction
2. Down-sea direction
3. Up-wind direction
4. Up-sea direction

3-41. Why is radar good for detecting storms?

1. Radar is powerful enough to penetrate storms
2. Radar receivers are sensitive
3. Ship movement causes more radar waves to hit the storm
4. Water is a very good reflector of RF energy

3-42. Which of the following factors determines the initial detection range of radar?

1. Radar PW
2. Radar power out
3. Radar height
4. Radar position

IN ANSWERING QUESTIONS 3-43 THROUGH 3-47, REFER TO FIGURE 6-1 AND TABLE 6-1 OF THE TEXT.

3-43. What switch is used to draw helicopter corridors on the PPI of the AN/SPA-25G?

1. SEQ
2. LINE
3. POINT
4. PLOT

3-44. The MASTER CLEAR switch is used to clear all plotted contacts from the PPI scope.

1. True
2. False

3-45. What is the maximum number of radars that can be assigned to a SPA-25G?

1. 5
2. 7
3. 9
4. 11

3-46. To delete a plot point from the SPA-25G, you should use the POINT switch.

1. True
2. False

3-47. What is the maximum decay time that can be set for signal decay on the SPA-25G?

1. Infinity
2. 10 Sec
3. 30 Sec
4. 60 Sec

3-48. What AN/UYA-4 console is also known as the Operations Summary Console?

1. OJ-194
2. OJ-197
3. OJ-451
4. OJ-452

3-49. If a striker wants to become a skilled radar operator, which of the following training methods will help most?

1. Reading radar maintenance manuals
2. Attending lectures on radar techniques
3. Practicing with radar sets
4. Observing skilled radar operators at work

3-50. What is the relationship between the strength of the target pip on the PPI and the position of the antenna beam pattern?

1. The strength of the target pip is greatest as the leading edge of the beam crosses the target
2. The target strength is weakest at the leading and trailing edges and strongest when the target is in the center of the beam
3. The target strength will remain the constant no matter where the target is within the beam
4. The target strength is strongest at the leading and trailing edges and weakest when the target is in the middle of the beam

3-51. The pip on a radar scope is always displayed perpendicular to the PPI sweep.

1. True
2. False

3-52. What type of distortion is reduced by using a constant range scale on the PPI scope?

1. Atmospheric
2. Pulsewidth
3. Beam width
4. PPI scope

3-53. Which of the following initial characteristics will best help a surface search operator to determine a target's size?

1. Bearing
2. Range
3. Course
4. Speed

3-54. A surface search radar will first pick up what part(s) of a ship?

1. Mast and superstructure
2. Bridge
3. Hull above the water
4. Deck housing

3-55. An aircraft flying directly toward your radar antenna will appear on the scope as a fairly weak pip. When this aircraft makes a turn, the pip strength will increase. What causes this increase in the pip strength?

1. A larger target area is exposed to the radar beam
2. There is a greater return of reflected radar energy
3. Both 1 and 2 above

3-56. The area that results when radar energy reflected from the surface of the water cancels portions of a target's radar return is known by what term?

1. Fluctuation area
2. Variation area
3. Fade area
4. Lobe area

IN ANSWERING QUESTIONS 3-57 AND 3-58, REFER TO FIGURE 7-1 OF THE TEXT.

3-57. On the PPI scope, you hold an aircraft (known to be flying at an altitude of 25,000 ft) at a range of 160 miles. If this target continues toward you at a constant altitude, at what approximate ranges can you expect to lose its radar return?

1. 142 miles, 95 miles, 80 miles, and 62 miles
2. 121 miles, 90 miles, 70 miles and 56 miles
3. 142 miles, 96 miles 75 miles, and 53 miles
4. 117 miles, 90 miles, 81 miles, and 65 miles

3-58. An aircraft is first detected at a range of 175 miles. The first fade on this contact occurs at 112 miles. The contact reappears at 95 miles and fades again at 70 miles. What is the approximate altitude of this aircraft?

1. 7,000 ft
2. 18,000 ft
3. 27,000 ft
4. 32,000 ft

3-59. Which of the following targets is most likely to remain in the same position or move slowly on your surface search scope while your ship is underway?

1. A ship
2. A jet aircraft
3. A land mass
4. A buoy

3-60. Why is the dot method of tracking usually preferred over the continuous line method?

1. The dot method reveals the nature of the target sooner
2. The dot method shows changes in course more clearly
3. The dot method indicates variations in speed more readily
4. The dot method is less apt to obscure other targets on the screen

3-61. A land target will most likely produce what type of pip?

1. One that usually has a steady brightness
2. One smaller than the pip of a normal surface contact
3. One that has true geographic motion
4. One that varies greatly in brightness

3-62. For which of the following reasons are sandspits and clear beaches considered poor radar targets?

1. They return very little energy
2. They offer very poor range information
3. Returns from them may be false due to the breaking surf
4. All the above

3-63. How does a swamp normally appear on radar?

1. As a blank area
2. As a weak echo only
3. As a strong echo always
4. As either a strong or weak echo, depending on the vegetation

3-64. Sometimes the pip of a land mass seems to be moving. What is the cause of this illusion?

1. The radar beam strikes different points on the land as the ship closes the land
2. The minor lobes create deceptive echoes
3. The transmitter creates double-range echoes
4. Other ships are moving near the land

3-65. Why do flat wooded islands have a stronger return than flat barren islands?

1. The trees give additional reflecting height
2. The trees have more reflecting surface
3. The echoes are produced from the water to the tree tops
4. The trees and water form a corner reflector

IN ANSWERING QUESTIONS 3-66 THROUGH 3-68, SELECT THE TARGET THAT IS BEST REPRESENTED BY THE SCOPE PICTURE GIVEN IN THE QUESTION.

3-66. A small steady contact moving quickly across the scope at a speed of 80 knots.

1. Helicopter
2. Rain cloud
3. Small island
4. Large convoy

3-67. A small, sharp contact that increases and decreases in brightness and has very little motion on the scope.

1. Ship
2. Small island
3. Airplane
4. Squall

3-68. A large contact with extremely fuzzy edges that is moving slowly on the scope.

1. Convoy
2. Aircraft
3. Cloud
4. Island

3-69. What type of weather most resembles a warm front when first observed on a PPI scope?

1. Cold front
2. Typhoon/hurricane
3. Snowstorm
4. Thunderstorm

3-70. What unique characteristic does a hurricane present on a PPI scope?

1. Fuzzy appearance
2. Long, straight, unbroken line
3. Heavy, scattered, large blotches
4. Circular appearance

3-71. What type of weather appears as a V or hook shape on the PPI scope?

1. Thunderstorm
2. Snowstorm
3. Tornado
4. Rain squall